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Alba 131

1871

A.M./F.M. compact portable radio receiver

Introduction

Alba model 131 is a compact a.m./f.m. portable radio receiver with a semi-conductor complement of ten transistors and four diodes. It is a two waveband receiver, the wavebands covered are 187-566m (m.w./a.m.), and 87-108Mc/s (v.h.f./f.m.), selection is by means of a slide-switch. Two aerials are incorporated, an internal ferrite rod assembly for m.w. and a telescopic aerial for v.h.f.

The circuit features a three stage i.f. amplifier for v.h.f./f.m., and a separate oscillator when switched to m.w. Additive mixing taking place in the base circuit of the first i.f. amplifier transistor stage.

A maximum power output of 480mW is handled by a 4in dia. permanent magnet loudspeaker of 4Ω impedance which is muted when an earphone jack plug is inserted in the socket provided. The output stage is compensated against variations in ambient temperature by the inclusion of a negative temperature co-efficient resistor in the push-pull class B output stage bias network.

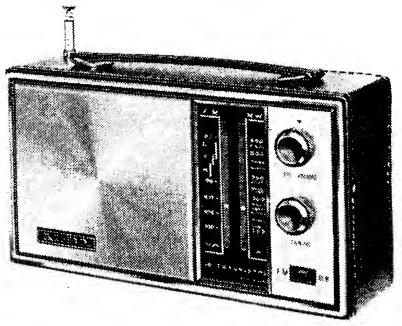
Power for the receiver is supplied by four Vidor type LPV11 cells or their equivalent.

Transistor analysis

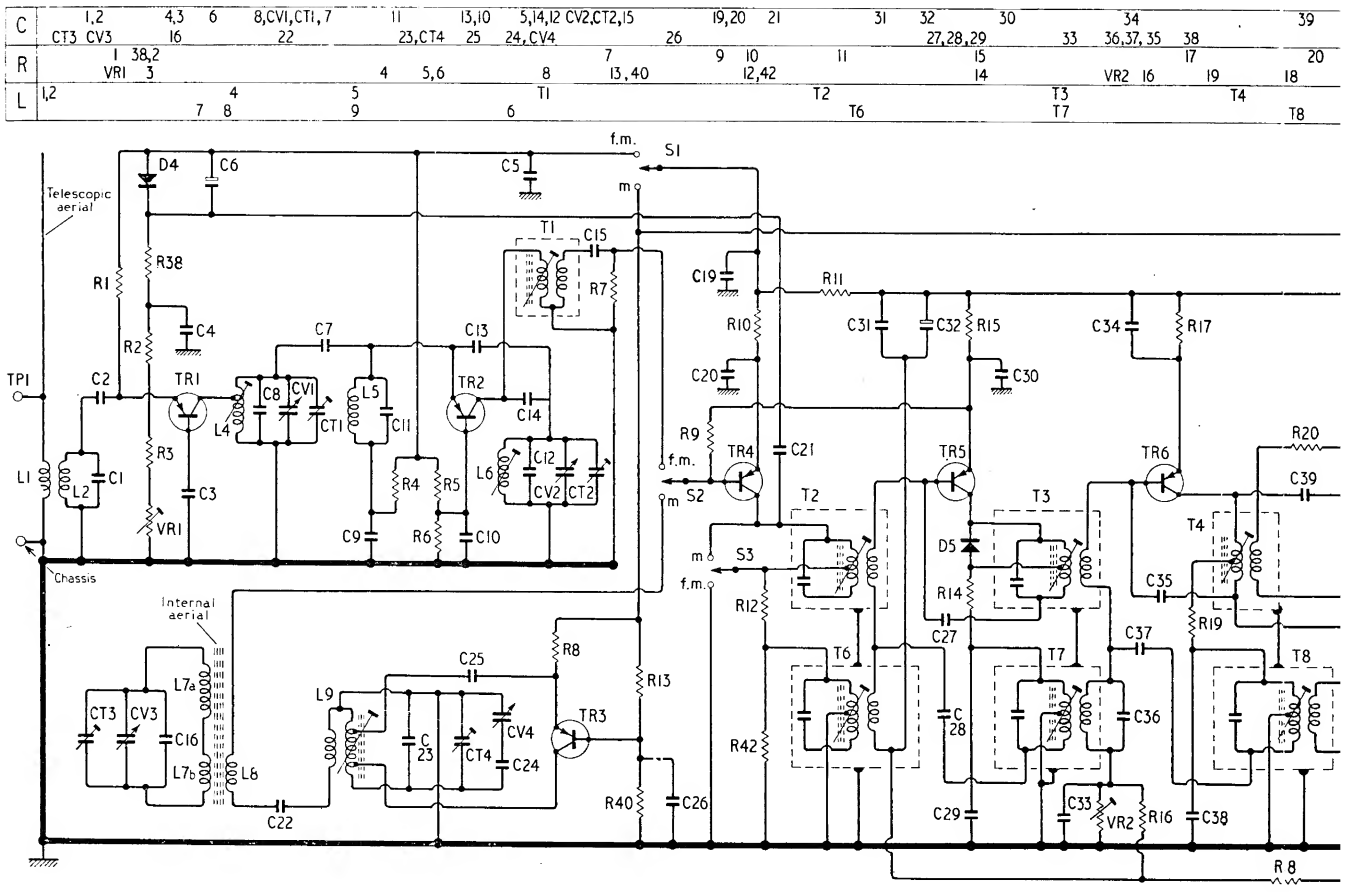
Transistor voltages quoted in cols. 5 and 6 were derived from technical information supplied by the manufacturers. They are all positive with respect to the battery negative and apply to quiescent conditions. The meter used was a model 8 Avometer.

Circuit alignment

Equipment required. – An r.f. signal generator covering the range 300kc/s-2Mc/s amplitude modulated 30 per cent at 400c/s; an f.m. sweep generator with the following ranges: 10·7Mc/s deviated 300kc/s at 50c/s, 87Mc/s and 108Mc/s deviated 25kc/s at 1kc/s on each range; an r.f. coupling coil; an output meter to match 4Ω terminated with a miniature jack plug; an oscilloscope (c.r.o.); a shunt diode rectifier network made up with a 2,000pF capacitor, an OA79 diode and a 33kΩ resistor (see illustration overleaf), and one each 0·01μF and 0·1μF capacitors.



Appearance of the Alba 131 radio receiver.



During a.m. alignment attenuate input signal so that receiver output does not exceed 50mW thereby preventing a.g.c. action masking the alignment peaks.

Switch on test equipment and allow 15 minutes (approximately) to warm up. Pre-set volume control to maximum and connect audio output meter via earphone jack. Loosely couple r.f. coupling coil to ferrite rod aerial, all a.m. i.f. and r.f. signals are fed via this source.

1. – Switch receiver to m.w. and tune to 550m. Feed in a 470kc/s a.m. signal and adjust **T8, T7** and **T6** for maximum output. Repeat until no further improvement can be obtained.

2. – With receiver still tuned to 550m, feed in a 545kc/s a.m. signal and adjust **L9** and **L7a** (by sliding coil former along ferrite rod) for maximum output.

3. – Tune receiver to 199m and feed in a 1,507kc/s a.m. signal. Adjust **CT4** and **CT3** for maximum output.

4. – Repeat operations 2 and 3 until no further improvement can be obtained. Disconnect a.m. signal generator.

5. – Switch receiver to v.h.f./f.m. and tune to a signal free position in the waveband. Connect the f.m. sweep generator via a 0·01μF capacitor to **TP1** and chassis and the c.r.o. via the diode network to TP2 and chassis. Detune **T5.**

6. – Feed in a 10·7Mc/s signal deviated 300kc/s at 50c/s. Adjust **T4, T3, T2** and **T1** for maximum amplitude, symmetrical about 10·7Mc/s (see Fig. 1). Attenuate input signal so that response amplitude is just large enough to produce a recognizable pattern.

7. – Disconnect and remove the diode network,

(Continued overleaf col. 1)

Transistor table

Transistor		A.M. Emitter (V)	Base (V)	Collector (V)	F.M. Emitter (V)	Base (V)	Collector (V)
TR1	2SA440 ..	.. —	—	—	4·8	4·3	—
TR2	2SA440 ..	.. —	—	—	3·8	3·5	—
TR3	2SA203AA	.. 4·5	4·3	—	—	—	—
TR4	2SA324 ..	.. 5·3	5·0	—	4·3	3·9	—
TR5	2SA321 ..	.. 5·3	5·0	0·05	5·0	4·7	0·05
TR6	2SA321 ..	.. 4·7	4·2	0·1	4·5	4·0	0·1
TR7	2SB185AA	.. 5·1	4·8	1·7	4·9	4·6	1·6
TR8	2SB186 ..	.. 4·4	4·1	0·3	4·2	3·9	0·3
TR9	2SB22 ..	.. 6·0	5·8	0·02	6·0	5·8	0·02
TR10	2SB22 ..	.. 6·0	5·8	0·02	6·0	5·8	0·02

Quiescent current: 20mA. Current drain at maximum output: 140mA.

Component values and locations

Resistors						Capacitors					
R1	220Ω	A1	R22	1kΩ	B2	C1	90pF	A2	C25	5,000pF	B2
R2	1·8kΩ	A2	R23	12kΩ	B2	C2	0·01μF	A1	C26	0·01μF	B1
R3	33kΩ	A1	R24	1kΩ	B2	C3	0·01μF	A1	C27	10pF	A2
R4	2·2kΩ	A2	R25	1kΩ	B2	C4	0·01μF	A2	C28	3pF	B2
R5	2·2kΩ	A2	R26	100kΩ	A1	C5	0·01μF	A2	C29	200pF	B2
R6	5·1Ω	A2	R27	12kΩ	A1	C6	5μF	A2	C30	0·04μF	A2
R7	39kΩ	A2	R28	820Ω	A1	C7	2pF	A1	C31	0·02μF	B2
R8	1·2kΩ	B2	R29	3·9kΩ	B1	C8	8pF	A1	C32	10μF	B2
R9	10kΩ	A2	R30	5·6kΩ	B1	C9	500pF	A2	C33	0·02μF	B2
R10	1kΩ	A2	R31	560Ω	B1	C10	1,000pF	A2	C34	0·02μF	B2
R11	100Ω	B2	R32	39kΩ	B1	C11	25pF	A2	C35	8pF	B2
R12	100Ω	A2	R33	1·5kΩ	B1	C12	8pF	A2	C36	2,000pF	B2
R13	3·3kΩ	B2	R34	100Ω	B1	C13	3pF	A1	C37	3pF	B2
R14	150Ω	B2	R35	100Ω	B1	C14	15pF	A2	C38	200pF	B2
R15	680Ω	A2	R36	2·7Ω	B1	C15	5,000pF	A2	C39	30pF	B2
R16	10kΩ	B2	R37	33kΩ	B1	C16	2pF	B1	C40	1,000pF	B2
R17	1kΩ	B2	R38	5·6kΩ	A2	C19	0·01μF	A2	C41	5μF	B2
R18	5·6kΩ	B2	R39	1kΩ	A1	C20	5,000pF	A2	C42	1,000pF	B2
R19	150kΩ	B2	R40	15kΩ	B1	C21	5pF	A2	C43	7,500pF	B2
R20	270Ω	B2	R42	120kΩ	A2	C22	5,000pF	A2	C44	0·01μF	B2
R21	330Ω	B2	VR1	100kΩ	A1	C23	5pF	A2	C45	0·01μF	B2
			VR2	100kΩ	B2	C24	200pF	A2	C46	5μF	A1
			VR3	5kΩ	A1				C47	5μF	A1
									C48	30μF	A1
									C49	0·04μF	B2
									C50	200μF	B2
									C51	200μF	B1
									C52	1μF	B1
									C53	1,000pF	A1
									C54	100μF	B1
									C55	5,000pF	B1
									C56	5,000pF	B1
									C57	200μF	B1
									C58	0·01μF	B2
									C59	1,000pF	B1
									C60	0·04μF	A1
									CT1	—	A1
									CT2	—	A1
									CT3	—	A1
									CT4	—	A1
									CV1	—	A1
									CV2	—	A1
									CV3	—	A1
									CV4	—	A1

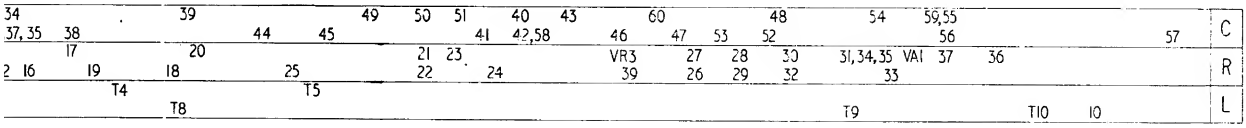
Coils and transformers

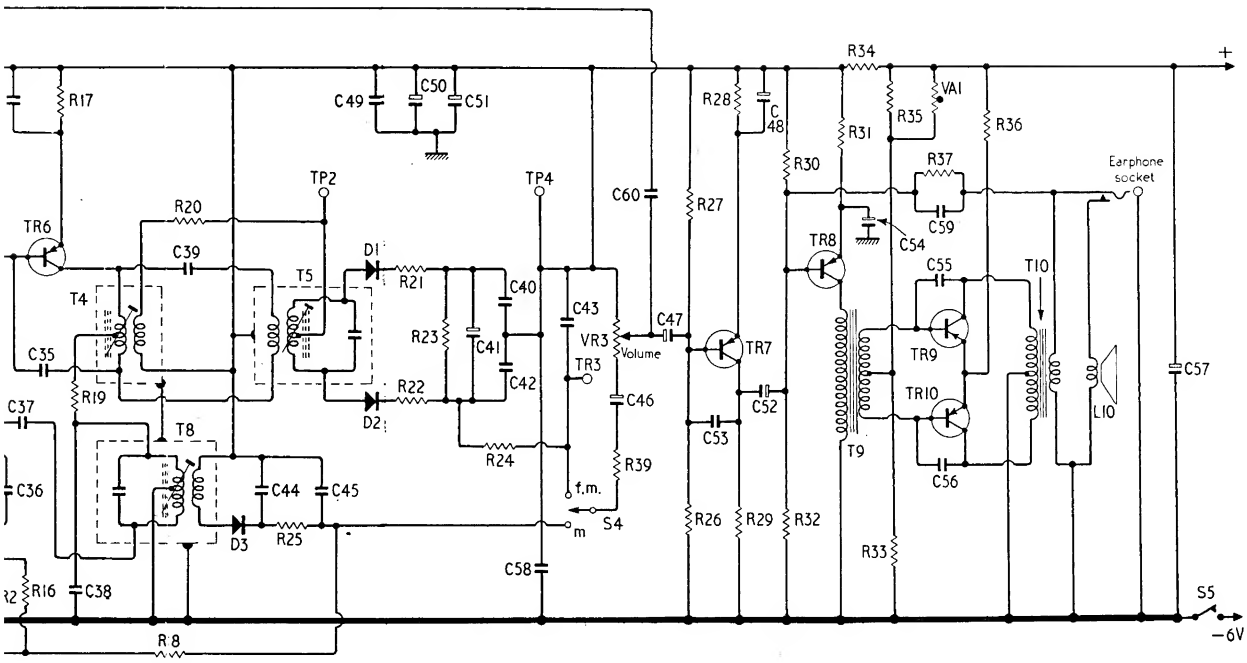
L1	—	B1
L2	—	
L4	—	A1
L5	—	A2
L6	—	A2
L7a,b	—	A1
L8	—	B1
L9	—	A2
L10	4Ω	**
T1	—	A2
T2	—	A2
T3	—	B2
T4	—	B3
T5	—	B3
T6	—	B2
T7	—	B3
T8	—	B3
T9	—	B1
T10	—	B2

Miscellaneous

D1-D3	1S188 or IN-60	B2
D4	1S188 or IN-60	A2
D5	1S188 or IN-60	B2
VAI	SDT-09	B1
S1-S4	—	A2
S5	—	†

† *On/off control*
** *Loudspeaker*





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Alba 131

Continued from overleaf—

then connect c.r.o. via a 0·1μF capacitor to **TP3** and chassis.

8. – Feed in a 10·7Mc/s signal deviated 300kc/s at 50c/s. Adjust **T4** for a symmetrical 'S' curve, and **T5** to centre 10·7Mc/s marker in the straight section of the curve (see Fig. 2).

9. – Repeat operations 6-8 for optimum response. Disconnect c.r.o.

10. – Tune receiver to 87Mc/s, pre-set volume control to maximum and feed in an 87Mc/s signal deviated 25kc/s at 1kc/s. Adjust **L6** and **L4** for maximum output as observed on the audio output meter.

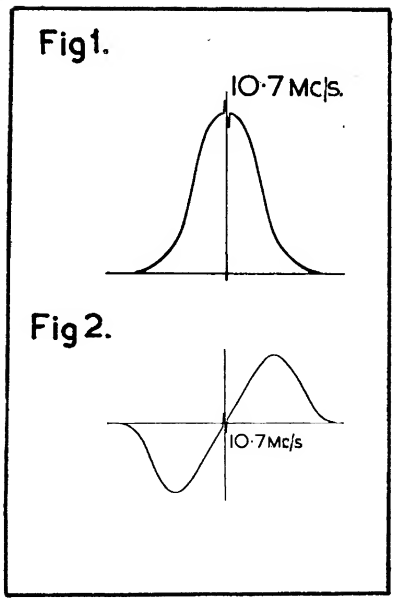
11. – Tune receiver to 108Mc/s and feed in a 108Mc/s signal, deviated 25kc/s at 1kc/s. Adjust **CT2** and **CT1** for maximum output as observed on audio output meter.

12. – Repeat operations 10 and 11 until no further improvement can be obtained. Disconnect and remove test equipment.

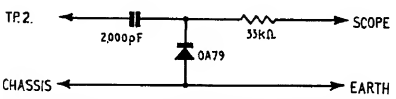
Sensitivity

M.w./a.m. sensitivity for 50mW output. – 1Mc/s via a 0·1μF capacitor to **TR4** base: 27μV. 470kc/s via a 0·1μF capacitor to the following stages: **TR4** base 16μV, **TR5** base 85μV, **TR6** base 1·5mV, **D3** anode 40mV.

V.h.f./f.m. sensitivity for 0·5V across **C41.** – 90Mc/s c.w. via 0·1μF capacitor to **TP1**: 30μV. 10·7Mc/s c.w. via 5pF to the following stages:



Above: Response curves.



Above: The shunt diode network as described under 'Circuit alignment'.

Manufacturer's service department

Alba (Radio and television) Limited,
52-70, Tabernacle Street,
London, E.C.2.

(Telephone: CLErkenwell 1322)

TR2 emitter 4·5mV., **TR4** base 11mV., **TR5** base 35mV., **TR6** base 550mV. For a 50mW output, a 90Mc/s signal deviated 25kc/s at 1kc/s fed via a 0·1μF capacitor to **TP1**: 7μV.

Dismantling

Remove control knobs (pull off), then unscrew and remove the screw securing the fibre cover. With reference to the sketch illustrating component locations on printed panel, unscrew and remove; three screws 'A'; one PK screw 'B', and the slotted pillar 'C'. The chassis may now be lifted out of the case.

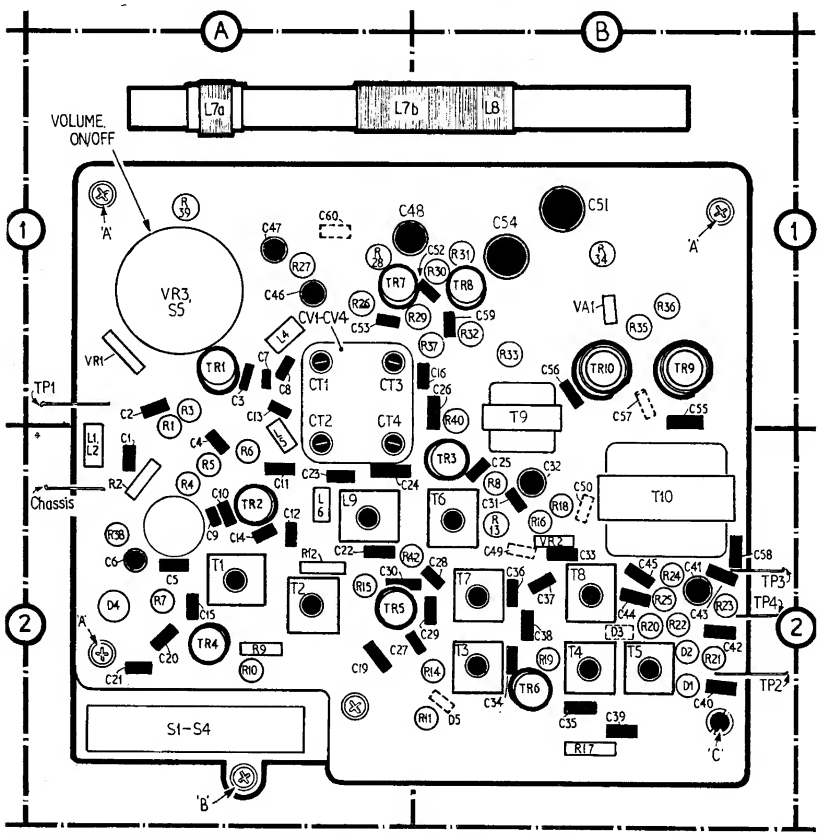
When replacing make sure mask is fitted to wavechange knob and fibre washer is fitted between wavechange switch bracket and front moulding at fixing 'B'.

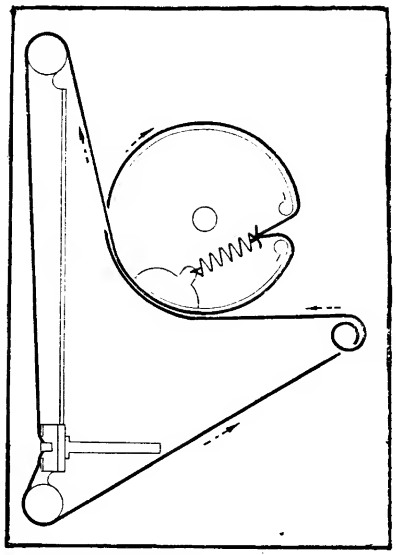
General notes

Drive cord replacement. – To replace drive cord remove chassis as described under "Dismantling". Prepare a suitable length of drive cord and with the tuning drum rotated fully clockwise route the cord as illustrated in sketch (below), making 2¼ turns anti-clockwise (winding from the rear), on the control spindle.

Adjustments. – Switch receiver to v.h.f./f.m. and adjust **VR1** for 600μA measured in the emitter circuit of **TR1**. Adjust **VR2** for 400μA measured in the collector circuit of **TR5.** Note: Both these current measurements were made under quiescent conditions.

Additional notes





Component-side view of the printed panel. Above right: Illustration of the drive cord assembly with the tuning drum rotated fully clockwise, as described under 'General notes' above.

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